
2009

**Adolescent Immunization Attitudes, Beliefs, and Practices Among
Montana Family Medicine Physicians and Pediatricians**



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EXECUTIVE SUMMARY

BACKGROUND: In 2008, the estimated immunization rates of Montana adolescents aged 13–17 years for several vaccines were lower compared with adolescents in the U.S. Utilizing a 1999 national survey evaluating physician (Pediatrics and Family Medicine specialties) attitudes and practices pertaining to adolescent immunizations, the Immunization Section of the Department of Public Health and Human Services conducted a similar assessment of Family Medicine physicians and pediatricians in Montana with the goal of assessing current attitudes, practices, and barriers related to immunizing Montana’s adolescents.

METHODOLOGY: In August 2009, a 60-question survey adapted from the previous national survey was sent to all known Montana pediatrician and Family Medicine physicians (n=632). The survey included questions regarding demographic information, degree of importance placed on ensuring adolescents are up-to-date on immunizations, adolescent immunization activities and practices, barriers to immunizing adolescents, and use of tracking or reminder/recall systems.

RESULTS: Eighty-nine (14.1%) of the 632 physicians contacted were discovered to be ineligible for study participation. Of the remaining 543 physicians, 190 (35.0%) responded to the survey. Of the total survey respondents, 164 (86%) met the eligibility criteria for participation. One-hundred twenty (73%) respondents were Family Medicine physicians and 44 (27%) were pediatricians. The majority of respondents agreed it is “very important” for adolescent patients to be up-to-date on their immunizations. The number of physicians scheduling return visits for immunizations was low. For adolescents aged 14–21 years, both pediatricians and Family Medicine physicians perceived the greatest barrier to administering vaccinations to be that adolescents rarely make preventive health visits. Only 35 (21%) respondents reported using reminder/recall systems to improve vaccination rates. For most items queried, the responses from Montana physicians in 2009 were similar to those from U.S. physicians in 1999.

DISCUSSION: The results of this survey suggest the majority of pediatricians and Family Medicine physicians in Montana recommend the appropriate vaccinations to adolescent patients and include immunization assessment in office visits for preventive care. However, barriers exist to administering vaccinations to adolescents, necessitating multifaceted approaches aimed at increasing the immunization rates of Montana adolescents.

RECOMMENDATIONS: Health-care providers should use each visit as an opportunity to assess immunization status and provide needed vaccines, schedule return visits for immunizations, use reminder systems that remind both the patient and the health-care provider that the patient is due for an immunization, and use recall systems that provide active outreach to schedule appointments for patients in need of immunizations.

INTRODUCTION

In 2008, the estimated immunization rates of Montana adolescents aged 13–17 years for several vaccines were lower compared with adolescents in the U.S., including: ≥ 2 doses of measles, mumps, rubella vaccine (MMR), ≥ 3 doses of hepatitis B vaccine, ≥ 1 dose of varicella vaccine, and ≥ 1 dose of meningococcal conjugate vaccine (MCV4).¹ The Advisory Committee on Immunization Practices (ACIP) currently recommends six vaccines be administered routinely to adolescents aged 11–18 years (Appendix A). Three of these vaccines are recommend to be given to those aged 11–12 years, including the tetanus, diphtheria, pertussis vaccine (Tdap), MCV4, and, for girls, the human papillomavirus vaccine (HPV4). The National Immunization Survey (NIS) data indicate low vaccination rates for adolescents, both nationally and in Montana, leaving unvaccinated teens vulnerable to many vaccine-preventable diseases that can also be spread to close contacts such as siblings and other family members.

Several factors have been associated with low vaccination rates in adolescents. For example, it is believed adolescents are likely to see a health-care provider only when ill and vaccinations are less likely to be offered during these sick visits. In addition, when adolescents visit a physician's office, the opportunity to be vaccinated can be affected by physician attitudes or practice protocols.^{2,3,4,5}

In 1999, a national assessment was conducted of physician (Pediatrics and Family Medicine specialties) attitudes and practices pertaining to adolescent immunizations.⁶ The Immunization Section of the Department of Public Health and Human Services (DPHHS) has conducted a similar assessment of Family Medicine physicians and pediatricians in Montana. This report describes the results of the DPHHS survey and discusses the attitudes, beliefs, and practices of Montana health-care providers regarding administering immunizations to adolescents.

METHODS

DPHHS contracted with Health Improvement Team, LLC to conduct the survey. In August 2009, an electronic list was compiled with the goal of including all Montana pediatricians and Family Medicine physicians (n=632). In late August 2009, a letter was sent from the State Medical Officer to each physician explaining the purpose of the study.

¹CDC National Immunization Survey (NIS) 2008; National, state, and local area vaccination coverage among children and adolescents aged 13-17 years. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5836a2.htm>

²Nichol KL, Zimmerman R. Generalist and subspecialist physicians' knowledge, attitudes, and practices regarding influenza and pneumococcal vaccinations for elderly and other high-risk patients: a nationwide survey. *Arch Intern Med.* 2001 Dec 10-24; 161(22): 2702-8.

³Shapiro Y, Heymann A, Shalev V, Maharshak N, Kremer E, Chodik G, Shemer J, Kokia E. Higher rates of influenza vaccination among patients of vaccinated physicians. Retrieved February 9, 2010 from <http://priority.com/fam/vacc.htm>

⁴Nichol KL, MacDonald R, Hauge M. Factors associated with influenza and pneumococcal vaccination among high-risk adult. *J Gen Intern Med.* 1996 Nov; 11(11):673-7.

⁵Rosenthal S, Kottenhahn R, Biro F, Succop P. Hepatitis B vaccine acceptance among adolescent and their parents. *J Adolesc Health* 1995;17:48-54.

⁶Oster NV, McPhillips-Tangum CA, Averhoff F, Howell K. Barriers to adolescent immunization: a survey of family physicians and pediatricians. *J Am Board Fam Pract* 2005; 18:13-19.

A survey was adapted from a 1999 national assessment after obtaining permission from the authors.⁶ Sixty questions were adapted from the original 94-item survey (Appendix B). This modified survey was made available to respondents either online or as a hard copy to be completed and returned by fax or mail.

The survey included questions regarding demographic information (questions 10–12), source of the physician's vaccine recommendations (question 2), degree of importance placed on ensuring adolescents are up-to-date on immunizations (question 4), adolescent immunization activities and practices (questions 1, 3), estimated number of patients up-to-date on selected immunizations, by age category (question 6), barriers to immunizing adolescents (question 7), and use of tracking or reminder/recall systems (question 5). Physicians who did not provide care to adolescent patients were asked to indicate this on the questionnaire and complete only the demographic portion. Each questionnaire requested the name of the physician or clinic to allow re-contact of initial non-respondents. Personal identifying information was omitted for anonymity following conclusion of the study period.

The DPHHS Institutional Review Board (IRB) approved this study.

RESULTS

Thirty-two (5.1%) physicians replied they were not pediatricians or Family Medicine physicians, 21 (3.3%) were no longer practicing medicine, and 20 (3.2%) did not administer vaccines to children. Sixteen (2.5%) physicians did not have a valid mailing address. Of the remaining 543 physicians, 190 (35.0%) physicians responded to the survey. Of the total survey respondents, 164 (86%) met the eligibility criteria for participation.

Demographics

One-hundred twenty (73%) respondents were Family Medicine physicians and 44 (27%) were pediatricians. Of the respondents, pediatricians and Family Medicine physicians had similar gender distributions (Table 1) and approximately one-half of respondents were born from 1950 to 1969.

Source of Vaccine Recommendations

Among pediatrician respondents, 98% indicated the American Academy of Pediatrics (AAP) as their source of vaccine recommendations, 68% the Advisory Committee on Immunization Practices (ACIP), 7% the American Academy of Family Physicians (AAFP), and 5% other sources (i.e., Centers for Disease Control and Prevention [CDC], DPHHS, etc.). In comparison, 73% of Family Medicine physician respondents indicated AAFP as their source of vaccine recommendations, 50% AAP, 46% ACIP, and 14% other sources (Table 2).

TABLE 1: Pediatrician and Family Medicine physician demographics, by specialty — Montana, 2009.

	Specialty		Total n = 164 (%)
	Pediatrics n = 44 (%)	Family Medicine n = 120 (%)	
Gender			
Female	26 (59)	60 (50)	86 (52)
Male	16 (36)	54 (45)	70 (43)
Did not answer	2 (5)	6 (5)	8 (5)
Year of Birth			
1930–1939	2 (5)	4 (3)	6 (4)
1940–1949	4 (9)	16 (13)	20 (12)
1950–1959	10 (23)	30 (25)	40 (24)
1960–1969	12 (27)	27 (23)	39 (24)
1970–1979	8 (18)	20 (17)	28 (17)
1980–1989	0 (0)	1 (1)	1 (1)
Did not answer	8 (18)	22 (19)	30 (18)

Ensuring Adolescents are Up-to-Date on Immunizations

The majority of respondents agreed it is “very important” for adolescent patients to be up-to-date on their immunizations (Table 3); 147 (91%) respondents reported it is “very important” to ensure adolescents are up-to-date on Tdap, 139 (86%) MMR, 131 (81%) MCV4, 114 (71%) hepatitis B vaccine, 112 (70%) HPV4, and 102 (63%) varicella vaccine. A higher percentage of pediatricians compared with Family Medicine physicians responded it is very important for adolescents to be up-to-date on hepatitis B, HPV4, and varicella vaccines.

Vaccines Routinely Recommended for Adolescents

Among respondents, 158 (96%) reported routinely recommending Tdap to adolescent patients, 147 (90%) HPV4, 143 (87%) MCV4, and 137 (84%) influenza vaccine (Table 2). Sixty-one (37%) respondents indicated routinely recommending all six ACIP recommended vaccines, (Tdap, MCV4, Hepatitis B, MMR, HPV4, and varicella) and 130 (79%) indicated routinely recommending Tdap, MCV4, and HPV4 for adolescents 11 to 12 years of age. Pediatricians more often than Family Medicine physicians reported routinely recommending each of the vaccines listed on the survey.

Immunization Activities Included in Preventive Health Visits

The number of physicians scheduling return visits for immunizations was low (Table 2). Eighty-six (52%) respondents reported scheduling return visits for those aged 11–13 years, 88 (54%) for 14–18 years, and 80 (49%) for 19–21 years. For each age category, pediatricians more often reported scheduling return visits for immunizations compared with Family Medicine physicians.

Up-to-Date on Immunizations

One-hundred twenty-two (74%) respondents reported >75% of their adolescent patients are up-to-date on MMR, 101 (62%) Tdap, 88 (54%) hepatitis B vaccine, and 37 (23%) varicella vaccine (Table 2). Of note, only 19 (12%) and 12 (5%) respondents estimated ≥75% of their patients were up-to-date for MCV4 and HPV4, respectively.

TABLE 2: Pediatrician and Family Medicine physician immunization activities and practices, by specialty — Montana, 2009.

	<i>Specialty</i>		
	Pediatrics n = 44 (%)	Family Medicine n = 120 (%)	Total n = 164 (%)
Source of vaccine recommendations			
American Academy of Pediatrics	43 (98)	60 (50)	103 (63)
Advisory Committee on Immunization Practices	30 (68)	55 (46)	85 (52)
American Academy of Family Practitioners	3 (7)	88 (73)	91 (55)
Other sources	2 (5)	17 (14)	19 (12)
Vaccines routinely recommended for adolescents			
Tetanus/diphtheria/pertussis (Tdap)	43 (98)	115 (96)	158 (96)
Human papillomavirus (HPV4)	43 (98)	104 (87)	147 (90)
Meningococcal conjugate (MCV4)	44 (100)	99 (83)	143 (87)
Influenza	43 (98)	94 (78)	137 (84)
Hepatitis B	29 (66)	75 (63)	104 (63)
Measles/mumps/rubella (MMR)	30 (68)	68 (57)	98 (60)
Hepatitis A	38 (86)	53 (44)	91 (55)
Varicella	39 (89)	49 (41)	88 (54)
Polio	15 (34)	38 (32)	53 (32)
Pneumococcal polysaccharide	12 (27)	29 (24)	41 (25)
Activities in preventive health visits by age category (years)			
<i>Assess immunization status</i>			
11–13	44 (100)	113 (94)	157 (96)
14–18	44 (100)	111 (93)	155 (95)
19–21	31 (70)	106 (88)	137 (84)
<i>Assess risk for Hepatitis A virus infection</i>			
11–13	26 (59)	41 (34)	67 (41)
14–18	26 (59)	44 (37)	70 (43)
19–21	15 (34)	44 (37)	59 (36)
<i>Administer needed immunizations</i>			
11–13	44 (100)	105 (88)	149 (91)
14–18	44 (100)	105 (88)	149 (91)
19–21	32 (73)	101 (84)	133 (81)
<i>Schedule return visits for immunizations</i>			
11–13	30 (68)	56 (47)	86 (52)
14–18	30 (68)	58 (48)	88 (54)
19–21	22 (50)	58 (48)	80 (49)
>75% adolescent patients up-to-date on immunizations			
MMR (2 doses)	34 (77)	88 (73)	122 (74)
Tdap	32 (73)	69 (58)	101 (62)
Hepatitis B (3 doses)	29 (66)	59 (49)	88 (54)
Varicella (2 doses)	12 (27)	25 (21)	37 (23)
MCV4	6 (14)	13 (11)	19 (12)
HPV4 (3 doses)	3 (7)	6 (5)	9 (5)
Use of recall/reminder systems			
Yes	10 (23)	25 (21)	35 (21)
No	30 (68)	79 (66)	109 (67)
Did not answer	4 (9)	16 (13)	20 (12)

Perceived Barriers to Immunizing Adolescents

Results for this section are summarized in Table 4. For adolescents aged 11–13 years, pediatricians perceived the greatest barrier to immunization are that adolescents and/or parents overestimate the risk of vaccine side-effects (n = 26 [59%]) compared with Family Medicine physicians who perceived the greatest barrier to be that adolescents are not aware of the need for immunization (n = 61 [51%]). For those aged 14–18 years and 19–21 years, both pediatricians (n = 27 [77%] and n = 25 [57%], respectively) and Family Medicine physicians (n = 74 [62%] and n = 80 [67%]) perceived the greatest barrier to be that adolescents rarely make preventive health visits.

Use of Reminder and Recall System

Thirty-five (21%) respondents reported using reminder/recall systems to improve vaccination rates (Table 2). The use of reminder/recall systems did not differ appreciably between pediatricians and Family Medicine physicians.

TABLE 3: Pediatrician (n = 44) and Family Medicine physician (n = 120) beliefs regarding the importance of ensuring adolescents are up-to-date on recommended immunizations, by specialty — Montana, 2009.

	<i>Not very important</i>			<i>Somewhat important</i>			<i>Very important</i>		
	Pediatrics (%)	Family Medicine (%)	Total (%)	Pediatrics (%)	Family Medicine (%)	Total (%)	Pediatrics (%)	Family Medicine (%)	Total (%)
Tdap*	0 (0)	1 (1)	1 (1)	0 (0)	1 (1)	1 (1)	42 (95)	105 (90)	147 (91)
MMR†	0 (0)	1 (1)	1 (1)	0 (0)	2 (2)	2 (1)	37 (84)	102 (87)	139 (86)
Meningococcal	1 (2)	13 (11)	14 (9)	3 (7)	21 (18)	24 (15)	40 (90)	81 (68)	121 (74)
Hepatitis B§	0 (0)	2 (2)	2 (1)	1 (2)	12 (10)	13 (8)	36 (82)	78 (67)	114 (71)
HPV¶	0 (0)	2 (2)	2 (1)	4 (9)	12 (10)	16 (10)	34 (77)	78 (65)	112 (70)
Varicella**	0 (0)	5 (4)	5 (3)	2 (5)	21 (18)	23 (14)	31 (70)	71 (61)	102 (63)

* Tdap = tetanus/diphtheria/pertussis

†MMR = measles, mumps, rubella (2 doses)

§Three doses

¶Human papillomavirus (HPV) (3 doses)

**Two doses

TABLE 4: Perceived barriers of Pediatricians (n = 44) and Family Medicine physicians (n = 120) to immunizing adolescents, by age category and specialty — Montana, 2009.

	<i>Age category (years)</i>		
	11–13	14–18	19–21
Adolescents rarely make preventive health visits			
Pediatrics	19 (43)	25 (77)	25 (57)
Family Medicine	51 (43)	74 (62)	80 (67)
Total	70 (43)	99 (60)	105 (64)
Adolescents not aware of need for immunizations			
Pediatrics	20 (45)	25 (57)	21 (48)
Family Medicine	61 (51)	71 (59)	74 (62)
Total	81 (49)	96 (59)	95 (58)
Adolescents and/or parents overestimated risk of vaccine side-effects			
Pediatrics	26 (59)	17 (39)	11 (25)
Family Medicine	51 (43)	45 (38)	38 (32)
Total	77 (47)	62 (38)	49 (30)
Adolescents and/or parents refuse to be vaccinated			
Pediatrics	18 (41)	12 (27)	11 (25)
Family Medicine	46 (38)	43 (36)	34 (28)
Total	64 (39)	55 (34)	45 (27)
Non-compliance with multiple dose vaccines (i.e., Hepatitis B vaccine)			
Pediatrics	16 (36)	18 (41)	12 (27)
Family Medicine	31 (26)	37 (31)	38 (32)
Total	47 (29)	55 (34)	50 (30)
Difficult to obtain verification of immunizations received elsewhere			
Pediatrics	12 (27)	12 (27)	12 (27)
Family Medicine	43 (36)	43 (36)	43 (36)
Total	55 (34)	55 (34)	55 (34)
Adolescents seek care from other facilities			
Pediatrics	11 (25)	12 (27)	15 (34)
Family Medicine	24 (30)	30 (25)	44 (37)
Total	35 (21)	42 (26)	59 (36)
Difficult to determine which adolescents need vaccine(s)			
Pediatrics	3 (7)	2 (5)	3 (7)
Family Medicine	11 (9)	16 (13)	17 (14)
Total	14 (9)	18 (11)	20 (12)
Difficult to determine which adolescents are "at-risk"			
Pediatrics	1 (2)	2 (5)	3 (7)
Family Medicine	8 (7)	11 (9)	10 (8)
Total	9 (5)	13 (8)	13 (8)
Obtaining consent per Montana law/regulations			
Pediatrics	3 (7)	1 (2)	0 (0)
Family Medicine	8 (7)	10 (8)	7 (6)
Total	11 (7)	11 (7)	7 (4)
Immunization NOT important due to low risk of disease			
Pediatrics	3 (7)	4 (9)	6 (14)
Family Medicine	6 (5)	6 (5)	7 (6)
Total	9 (5)	10 (6)	13 (8)

DISCUSSION

The results of this survey suggest the majority of pediatricians and Family Medicine physicians in Montana recommend the appropriate vaccinations to adolescent patients and include immunization assessment in office visits for preventive care. In addition, the majority of respondents agreed that it is very important for adolescent patients to be up-to-date on Tdap, MMR, hepatitis B vaccine, HPV vaccine, and varicella vaccine. Furthermore, the majority of physicians surveyed believe >75% of their adolescent patients are up-to-date on MMR, Tdap, and hepatitis B vaccine.

However, significant challenges exist to achieving high adolescent immunization rates in Montana. Physicians reported a variety of potential barriers to administering vaccinations to adolescents — these results suggest that multifaceted approaches, including but not limited to the use of regular patient and parent education, or the use of reminder/recall systems, might be required to increase and sustain adolescent immunization rates. However, only a small minority of respondents reported using recall/reminder systems in their adolescent patient populations.

Notably, pediatrician and Family Medicine physicians differed in many responses. For instance, pediatricians and Family Medicine physicians differ in their primary source of information for vaccine recommendations. Pediatricians are also more likely to assess immunization status of patients aged 11–18 years, assess risk for hepatitis A vaccination, administer needed immunizations, and schedule return visits for immunizations. Additionally, pediatricians are also more likely than Family Medicine physicians to recommend the following vaccines to their adolescent patients: Tdap, HPV4, MCV4, influenza, hepatitis B, MMR, hepatitis A, and varicella. The results of the survey do not indicate why knowledge, attitudes, beliefs, and practices differ between pediatricians or Family Medicine physicians. The survey also did not assess practice type or setting, which might partially explain some of the noted differences.

Overall and for most items queried, the responses from Montana physicians in 2009 were quite similar to those from U.S. physicians in 1999 (Table 5). For example, both cohorts assigned a higher level of importance to be up-to-date for Tdap compared with varicella vaccination, and only about one in five physicians in each group used a recall/reminder system. There were a few notable differences between Montana physicians in 2009 compared with those from U.S. physicians in 1999, including: a) Montana physicians were less likely to schedule return visits for immunization, b) Montana physicians were more likely to report that adolescents (or their parents) refused vaccination, c) Montana physicians were more than twice as likely to report that adolescents (or their parents) overestimated the risk of vaccine side-effects, and d) Montana physicians were less likely to recommend hepatitis B and MMR to their adolescent patients. Similarly, Montana physicians were less likely to report that MMR and hepatitis B vaccines were “very important” for adolescent patients. These differences may provide useful areas to emphasize enhanced and continued intervention efforts.

Table 5: Notable differences in reported attitudes and practices between physicians in Montana (2009) and U.S. physicians responding to a national survey (1999).

Attitude/Practice	Age (years)	% Reporting attitude/practice	
		Montana n = 164	U.S. n = 210
Schedule return visits for immunization	11–13	52	78
	14–18	54	74
	19–21	49	60
Consider up-to-date status to be very important for			
MMR (2 doses)		86	97
Hepatitis B (3 doses)		71	86
Report that adolescents (or parents) refused vaccination	11–13	39	11
	14–18	34	10
	19–21	27	11
Overestimate the risk of vaccine side-effects	11–13	47	22
	14–18	38	19
	19–21	30	17

The results presented in this report should be interpreted with caution because of several important study limitations. First, the survey had a low response rate (35%) and may be subject to non-respondent bias. Therefore, the results presented in this survey might not be indicative of the attitudes, beliefs, or practices of the majority of Montana pediatricians or Family Medicine physicians. Additionally, the results of this survey are based on self-reported information and the key practices reported were not validated. Moreover, statistical tests were not applied to the comparison between pediatricians and Family Medicine physicians, or between Montana physicians surveyed in 2009 and U.S. physicians surveyed in 1999, so it is not known if the noted differences meet statistical significance. Finally, this survey might not be comparable to the similar survey performed among U.S. physicians in 1999, considering many changes in the last ten years have occurred in both the number of vaccines recommended for use in adolescents and the recommended vaccine schedules. However, despite these limitations, the findings of this survey suggest potential intervention activities that could be used to increase the adolescent immunization rates in Montana.

Recommendations

Based on the results from this survey and evidence-based strategies in the medical literature^{3,5,7,8,9}, we offer the following recommendations to Montana health-care providers for improving adolescent immunization rates in Montana.

- Educate the adolescent patient and their parent(s) about the risk of acquiring a vaccine-preventable disease and the importance of immunization.
- Provide patient and parent education to address common misconceptions concerning immunizations and to ensure informed decision-making.
- Use each visit as an opportunity to assess immunization status and provide needed vaccines (*e.g.*, sports or camp physicals, pre-college assessments, well-child visits, and gynecological visits).
- Schedule return visits for immunizations.
- Use reminder/recall systems to communicate to a patient and to a health-care provider that the patient is due for an immunization (***reminder***). In addition, use active outreach by letter or phone to schedule appointments for patients in need of immunization (***recall***).
- Use the Montana Immunization Registry (WIZRD) to access a patient's consolidated immunization record. WIZRD provides health-care providers with immunization information in a wide variety of treatment settings.

Acknowledgements

We thank Judith Gedrose MN for initiating the survey and Sofia Warden of Health Improvement Team, LLC for conducting the survey and for providing analytical assistance throughout the survey.

⁷ Szilagyi PG, Bordley C, Vann JC; et al. Effect of patient reminder/recall interventions on immunization rates. *JAMA* 2000; 284:1820–1827.

⁸ Daley MF, Beaty BL, Barrow J, et al. Missed opportunities for influenza vaccination in children with chronic medical conditions. *Arch Pediatr Adolesc Med.* 2005 October; 159: 986–991

⁹ Daley MF, Steiner JF, Brayden RM, Xu S, Morrison S, Kempe A. Immunization registry-based recall for a new vaccine. *Ambulatory Pediatrics* 2002;2:438 443

APPENDIX A: Survey Questionnaire

The following questions are for physicians who provide care to adolescent patients (ages 11-21).
If you do NOT provide care to adolescent patients, please check here ☐ and Go to Question 10.

1. In your practice, which vaccines are routinely recommend for adolescent patients (ages 11-21)? (Check ALL that apply)

<input type="checkbox"/> Tetanus, diphtheria& pertussis (Tdap)	<input type="checkbox"/> Hepatitis B
<input type="checkbox"/> Influenza	<input type="checkbox"/> Hepatitis A
<input type="checkbox"/> Polio	<input type="checkbox"/> Varicella (2)
<input type="checkbox"/> MMR (2 doses)	<input type="checkbox"/> Human papillomavirus (females only)
<input type="checkbox"/> Meningococcal conjugate	<input type="checkbox"/> Pneumococcal polysaccharide
<input type="checkbox"/> Other: _____	

2. What are the sources of your vaccine recommendations? (Check ALL that apply)

<input type="checkbox"/> AAP	<input type="checkbox"/> ACIP	<input type="checkbox"/> AAFP	<input type="checkbox"/> Other: _____
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3. Which of the following immunization activities are typically included in a preventive health visit for adolescents in the following age ranges? (Check ALL that apply)

	Ages: 11-13	14-18	19-21
Assess immunization status	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assess risk for Hepatitis A virus infection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Administer needed immunizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Schedule return visits for immunizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Please specify: _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. To what extent do you feel it is important to ensure adolescents are up-to-date with their protection against the following diseases: (1 = not very important; 5 = very important)

	Not Very Important				Very Important
Hepatitis B (3 dose series)	1	2	3	4	5
MMR (2 dose series)	1	2	3	4	5
Varicella (2 doses)	1	2	3	4	5
Tetanus/diphtheria/pertussis (Tdap)	1	2	3	4	5
Meningococcal conjugate	1	2	3	4	5
Human papillomavirus (3 doses)	1	2	3	4	5

5. Does your practice have a tracking or reminder/recall system to identify and contact adolescents who are due or overdue for immunizations?

<input type="checkbox"/> Yes	<input type="checkbox"/> No
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6. In your opinion, what proportion of your adolescent patients is up-to-date on their protection against the following diseases? (Check ONE for each vaccine)

	<u><25%</u>	<u>26-50%</u>	<u>51-75%</u>	<u>>75%</u>
Hepatitis B (3 doses)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MMR (2 doses)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Varicella (2 doses)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tetanus/diphtheria/pertussis (tdap)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Meningococcal conjugate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Human papillomavirus (3 doses)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please complete additional questions on next page....

7. In your opinion, what are the major barriers to vaccinating adolescents in the following age ranges? (Check ALL that apply)

	Ages: 11-13	14-18	19-21
Adolescents rarely make preventive health visits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adolescents seek care from other facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adolescents not aware of need for immunizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adolescents and/or parents refuse to be vaccinated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adolescents and/or parents underestimate risk of disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adolescents and/or parents overestimated risk of vaccine side-effects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficult to determine which adolescents need vaccine(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficult to obtain verification of immunizations received elsewhere	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficult to determine which adolescents are "at-risk"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Non-compliance with multiple dose vaccines (i.e., 3-dose HepB)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Obtaining consent as per State law/regulations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Immunization not important due to low risk of disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Please specify:_____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. How do you identify adolescents at-risk for Hepatitis A? (Check ALL that apply)

- ☐ Ask all adolescents about sexual behavior
☐ Ask adolescents over a certain age about sexual behavior (Please specify age:____)
☐ Look for indications of high risk behavior (e.g., STD, etc.)
☐ Other (Please specify:_____)

9. Which of the following factors influence your decision to recommend Hepatitis A vaccination to your adolescent patients? (Check ALL that apply)

- ☐ Recommendations from advisory committees (e.g., ACIP, AAP, AAFP, etc.)
☐ Trend toward more high-risk behavior among adolescents
☐ Belief that all adolescents should be vaccinated, regardless of risk
☐ Coverage of vaccine by insurers
☐ Payment for vaccine administration by insurers
☐ Other (Please specify:_____)

10. What is your specialty? ☐ Pediatrics ☐ Family or General Practice ☐ Other:_____

11. What is your gender? ☐ Male ☐ Female

12. In what year were you born? 19 ____


Survey used with permission of: Oster, N., McPhillips-Tangum, C., Averhoff, C. and Howell, K. (2005).
 Barriers to adolescent immunization: A survey of family physicians and pediatricians. JABFP, 18(1), 13-19.


Appendix B

Recommended Immunization Schedule for Persons Aged 7 Through 18 Years—United States • 2010

Vaccine ▼	AGE ►	7-10 years	11-12 years	13-18 years
Tetanus, Diphtheria, Pertussis			Tdap	Tdap
Human Papillomavirus ²	See footnote 2		HPV (3doses)	HPV series
Meningococcal ³		MCV	MCV	MCV
Influenza ⁴			Influenza (yearly)	
Pneumococcal ⁵			PPSV	
Hepatitis A ⁶			HepA series	
Hepatitis B ⁷			Hep B series	
Inactivated Polio Virus ⁸			IPV Series	
Measles, Mumps, Rubella ⁹			MMR Series	
Varicella ¹⁰			Varicella Series	

 Range of recommended ages for all children except certain high-risk group

 Range of recommended ages for catch-up immunization

 Range of recommended ages for certain high-risk groups

This schedule includes recommendations in effect as of December 15, 2009. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. The use of a combination vaccine generally is preferred over separate injections of its equivalent component vaccines. Considerations should include provider assessment, patient preference, and the potential for adverse events. Providers should consult the relevant Advisory Committee on Immunization Practices statement for detailed recommendations: <http://www.cdc.gov/vaccines/pubs/acip-list.htm>. Clinically significant adverse events that follow immunization should be reported to the Vaccine Adverse Event Reporting System (VAERS) at <http://www.vaers.hhs.gov> or by telephone, 800-822-7967.

1. Tetanus and diphtheria toxoids and acellular pertussis vaccine (Tdap). (Minimum age: 10 years for Boostrix and 11 years for Adacel)

- Administer at age 11 or 12 years for those who have completed the recommended childhood DTP/DTaP vaccination series and have not received a tetanus and diphtheria toxoid (Td) booster dose.
- Persons aged 13 through 18 years who have not received Tdap should receive a dose.
- A 5-year interval from the last Td dose is encouraged when Tdap is used as a booster dose; however, a shorter interval may be used if pertussis immunity is needed.

2. Human papillomavirus vaccine (HPV). (Minimum age: 9 years)

- Two HPV vaccines are licensed: a quadrivalent vaccine (HPV4) for the prevention of cervical, vaginal and vulvar cancers (in females) and genital warts (in females and males), and a bivalent vaccine (HPV2) for the prevention of cervical cancers in females.
- HPV vaccines are most effective for both males and females when given before exposure to HPV through sexual contact.
- HPV4 or HPV2 is recommended for the prevention of cervical precancers and cancers in females.
- HPV4 is recommended for the prevention of cervical, vaginal and vulvar precancers and cancers and genital warts in females.

- Administer the first dose to females at age 11 or 12 years.
 - Administer the second dose 1 to 2 months after the first dose and the third dose 6 months after the first dose (at least 24 weeks after the first dose).
 - Administer the series to females at age 13 through 18 years if not previously vaccinated.
 - HPV4 may be administered in a 3-dose series to males aged 9 through 18 years to reduce their likelihood of acquiring genital warts.
- 3. Meningococcal conjugate vaccine (MCV4).**
- Administer at age 11 or 12 years, or at age 13 through 18 years if not previously vaccinated.
 - Administer to previously unvaccinated college freshmen living in a dormitory.
 - Administer MCV4 to children aged 2 through 10 years with persistent complement component deficiency, anatomic or functional asplenia, or certain other conditions placing them at high risk.
 - Administer to children previously vaccinated with MCV4 or MPSV4 who remain at increased risk after 3 years (if first dose administered at age 2 through 6 years) or after 5 years (if first dose administered at age 7 years or older). Persons whose only risk factor is living in on-campus housing are not recommended to receive an additional dose. See *MMWR* 2009;58:1042–3.
- 4. Influenza vaccine (seasonal).**
- Administer annually to children aged 6 months through 18 years.
 - For healthy nonpregnant persons aged 7 through 18 years (i.e., those who do not have underlying medical conditions that predispose them to influenza complications), either LAIV or TIV may be used.
 - Administer 2 doses (separated by at least 4 weeks) to children aged younger than 9 years who are receiving influenza vaccine for the first time or who were vaccinated for the first time during the previous influenza season but only received 1 dose.
 - For recommendations for use of influenza A (H1N1) 2009 monovalent vaccine. See *MMWR* 2009;58(No. RR-10).
- 5. Pneumococcal polysaccharide vaccine (PPSV).**
- Administer to children with certain underlying medical conditions, including a cochlear implant. A single revaccination should be administered after 5 years to children with functional or anatomic asplenia or an immunocompromising condition. See *MMWR* 1997;46(No. RR-8).
- 6. Hepatitis A vaccine (HepA).**
- Administer 2 doses at least 6 months apart.
 - HepA is recommended for children aged older than 23 months who live in areas where vaccination programs target older children, who are at increased risk for infection, or for whom immunity against hepatitis A is desired.
- 7. Hepatitis B vaccine (HepB).**
- Administer the 3-dose series to those not previously vaccinated.
 - A 2-dose series (separated by at least 4 months) of adult formulation Recombivax HB is licensed for children aged 11 through 15 years.
- 8. Inactivated poliovirus vaccine (IPV).**
- The final dose in the series should be administered on or after the fourth birthday and at least 6 months following the previous dose.
 - If both OPV and IPV were administered as part of a series, a total of 4 doses should be administered, regardless of the child's current age.
- 9. Measles, mumps, and rubella vaccine (MMR).**
- If not previously vaccinated, administer 2 doses or the second dose for those who have received only 1 dose, with at least 28 days between doses.
- 10. Varicella vaccine.**
- For persons aged 7 through 18 years without evidence of immunity (see *MMWR* 2007;56[No. RR-4]), administer 2 doses if not previously vaccinated or the second dose if only 1 dose has been administered.
 - For persons aged 7 through 12 years, the minimum interval between doses is 3 months. However, if the second dose was administered at least 28 days after the first dose, it can be accepted as valid.
 - For persons aged 13 years and older, the minimum interval between doses is 28 days.